7. Pseudorandom Numbers

Program Name: Pseudo.java   Input File: pseudo.dat

Bryan wants to generate random values to use in an app that he is writing but he is concerned about both speed and memory. He has decided to use a pseudorandom number generator, Linear Congruential Generator (LCG), which is fast and uses little memory. A plus is that an LCG is easy to implement; a minus is that it should only be used in certain types of applications.

When using an LCG, a new number `N` is created using these steps:
1. multiply the previous number `P`, also called the seed, by a given constant `C`
2. increment the product in step 1 by another constant `I`
3. mod the result in step 2 by another constant `M`

The formula is `N=(P*C+I) (mod M)`. This formula will generate at most `M` distinct pseudorandom numbers before repeating the sequence of numbers again. Hence, an LCG is considered to be cyclic.

You are to write a program that will print, in the order they are created, all of the pseudorandom numbers created until the first cycle is complete.

Input
The first line of input will contain a single integer `n` that indicates the number LCGs that you are to create. Each of the following `n` lines will contain 4 integers `P C I M` as defined above. Each of items will be separated by a space.

Output
On a single line, separated by a space, and in the order they are created, you will print all of the pseudorandom numbers created until the first cycle is complete.

Note: A space is optional at the end of each line.

Example Input File
```
3
4 7 5 12
5 5 3 7
12 13 15 16
```

Example Output to Screen
```
9 8 1 0 5 4
0 3 4 2 6 5
11 14 5 0 15 2 9 4 3 6 13 8 7 10 1 12
```